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What is Claimed is:

1. A method of coating zeolite crystals which comprises depositing, impregnating or coating a liquid that contains a compound capable of satisfying at least one of the following compounds (1) to (3) to a substrate and then bringing the same into contact with a slurry, sol or solution that contains zeolite crystals:

(1) an acid,

(2) an ester forming carboxylate anion by dissociation, and

(3) a metal carboxylate salt that forms carboxylate anion by dissociation.

2. A method of coating zeolite crystals in which the compound capable of satisfying at least one of (1) to (3) in claim 1 is one or more of compounds selected from lactic acid, lactate ester, metal lactate salt, glycolic acid, glycolate ester and metal glycolate salt.

3. A method of coating zeolite crystals in which the following relations (α) and (β) are established between pH of the liquid deposited, impregnated or coated to the substrate (pH_1) and pH of the slurry, sol or solution that contains zeolite crystals (pH_2) in claim 1:

(α) $11 < (pH_1) + (pH_2) < 17$

(β) when $pH_1 < 7$, $pH_2 > 7$ and when $pH_1 > 7$, $pH_2 < 7$.

4. A substrate containing a layer made of zeolite crystal particles with a thickness of 0.5 μm or less, in which at least one surface of the substrate is covered with the layer made of zeolite crystal particles and the zeolite crystal particles are oriented.

5. A substrate containing the layer made of zeolite crystal particles as defined in claim 4, wherein the substrate is porous.

6. A substrate containing MFI type zeolite crystals that satisfies the following relations (A) and (B) when X-ray diffraction is measured for a zeolite-coated surface, using CuKα as a X-ray source (wavelength: 0.154 nm), fixing an angle of incidence to 3°, at a scanning rate of 2θ 4°/min in a parallel optical system,

(A) $a/b = 0.3$ to 1.5

(B) $b/c > 4.4$

in which

<u>a</u> represents a peak intensity for a maximum peak in $2\theta = 7.3$ to 8.2,

<u>b</u> represents a peak intensity for a maximum peak in

2θ = 8.5 to 9.1, and

c represents a peak intensity for a maximum peak in 2θ = 13.0 to 14.2.

7. A method of manufacturing a zeolite membrane which comprises:

(a) a step of coating zeolite crystals by the method as defined in any one of claims 1 to 3,

(b) a step of bringing the coated zeolite crystals into contact with a zeolite precursor and

(c) a step of subsequently crystallizing the zeolite precursor.

8. A method of manufacturing a zeolite membrane as defined in claim 7, wherein the type ofzeolite is MFI.

9. A method of processing a zeolite membrane which comprises bringing the zeolite membrane with a processing agent having active groups reactive with OH groups and forming inorganic oxides after calcining, as well as water and/or steams.

10. A method of processing a zeolite membrane as defined in claim 9, wherein one surface of the zeolite membrane is brought into contact with the processing agent and a

pressure on the other surface of the zeolite membrane is made lower than that on the surface in contact with the processing agent.

11. A method of processing a zeolite membrane as defined in claim 9 or 10, wherein the processing agent is represented by (I) or (II):

(I) $R_x\text{-}M1\text{-}X_{4-x}$

(II) $R_y\text{-}M2\text{-}X_{3-y}$

(where R represents an alkyl group or aryl group, X represents an active group reactive with OH group, x is 0, 1, 2 or 3 and y represents 0, 1 or 2, M1 represents any one of titanium, silicon, germanium and M2 represents boron or aluminum).

12. A method of processing a zeolite membrane as defined in claim 9 or 10, wherein the processing agent is represented by (III) or (IV):

(III)

$$\begin{array}{c} A \\ | \\ R - M1 - X \\ | \\ A \end{array}$$

(IV)

$$\begin{array}{c} A \\ | \\ R - M2 - X \end{array}$$

(where R represents an alkyl group or aryl group, in which a hydrogen atoms are partially or entirely substituted by fluorine, A represents an alkyl group, aryl group, methoxy group, ethoxy group or chlorine and X represents an ethoxy group, methoxy group, hydroxyl group or chlorine, M1 represents any one of titanium, silicon and germanium and M2 represents boron or aluminum).

13. A method of processing a zeolite membrane as defined in claim 11 or 12, wherein R in the processing agent (I) to (IV) has a structure represented by (V):

(V) $CF_3(CF_2)_n(CH_2)_m$-

where n is an integer from 0 to 7, and m is an integer from 0 to 3).

14. A method of processing a zeolite membrane which comprises bringing a zeolite membrane and a processing agent having functional groups capable of reacting with silanol groups of zeolite into contact with each other under the absence of water and then applying a heat treatment and/or pressure reducing treatment.

15. A method of processing a zeolite membrane as defined in claim 14, which uses a processing agent having, in the molecule, only one functional group capable of reacting

with silanol groups of zeolite.

16. A zeolite membrane obtained by the method as defined in any one of claims 7 to 15, wherein the permeation rate of pure nitrogen is greater than the permeation rate of pure hydrogen.

17. A zeolite membrane obtained by the method as defined in any one of claims 7 to 15, wherein the angle of contact with water is 70° or more and an angle of contact with ethylene glycol is 65° or more.

18. A zeolite membrane obtained by the method as defined in any one of claims 7 to 15, wherein the concentration of fluorine atoms on the surface of the zeolite membrane is 5 x 10^{-7} mol/m^2 or more.

19. An aluminum electrolytic capacitor in which a zeolite membrane obtained by the method as defined in any one of claims 7 to 15 is attached.

20. A degassing membrane disposed with a zeolite membrane obtained by a method as described in any one of claims 7 to 15.

21. A method of separating substances in which a zeolite membrane obtained by the method as defined in any one of claims 7 to 15 is brought into contact with a substance as a target for separation.

22. A method of separating alcohol from an aqueous solution of alcohol at low concentration by using a zeolite membrane obtained by the method as defined in any one of claims 7 to 15.